12027

Drive Tube

80 grams

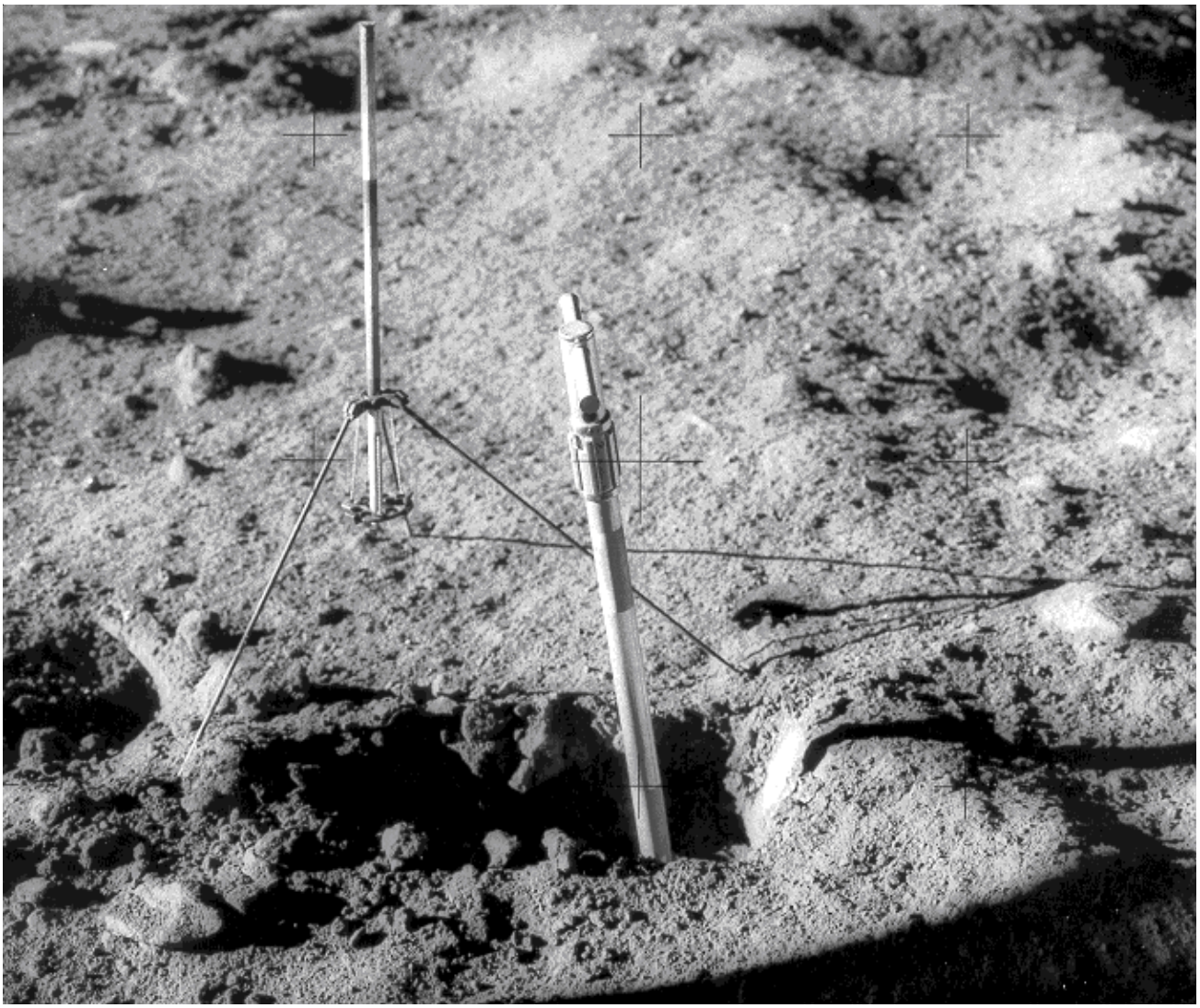


Figure 1: Trench at Sharp Crater with 12027 core tube taken from the bottom. NASA AS12-49-7279.

Introduction

Drive tube 12027 was collected from the bottom of the trench (20 cm deep) where 12023 and 12024 were collected (figure 1). It was 17 cm long and extended the depth below surface from 20 to 37 cm, although length and depth do not correspond well for Apollo 12 drive tubes. Newsletter #26 gives the initial description.

Petrography

Morris and Lauer (1982) determined the maturity of samples from different depths of core 12027 (figure 4). The top and bottom of the core were found to be submature (I_s/FeO = 40), while the middle section was mature (I_s/FeO = 75).

Nagle J.S. (1980) studied the percentage of particles in each size range. There was a lot of coarse basalt particles in the zone from 1 to 2.5 cm and an abundance of agglutinates at the bottom of the core (figure 5).

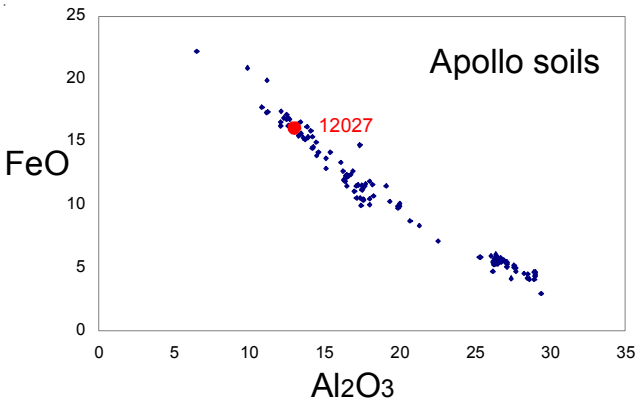


Figure 2: Composition of 12027 compared with lunar soil samples.

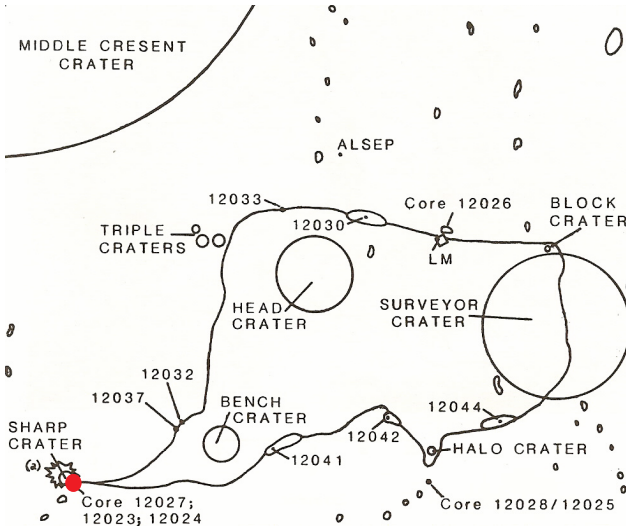


Figure 3: Location of 12027 at Sharp Crater.

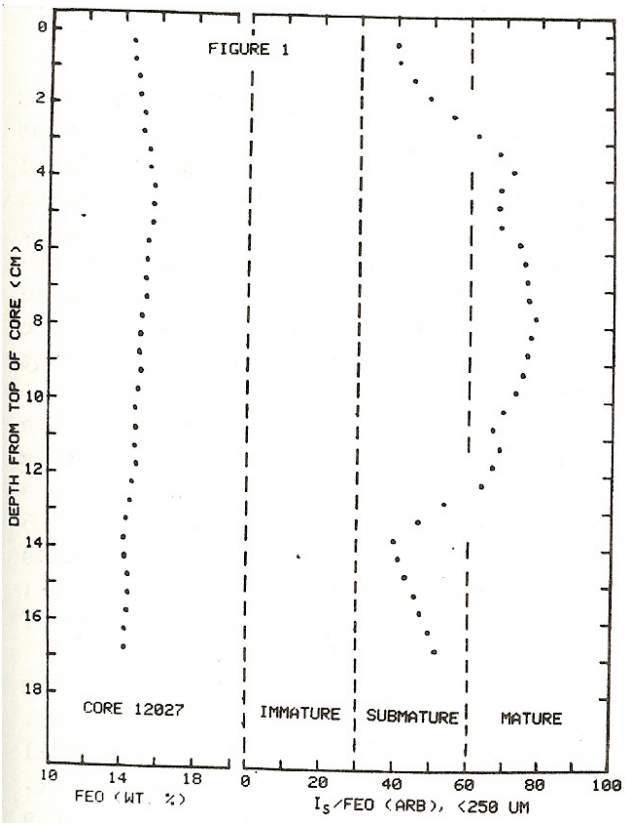


Figure 4: Iron content and maturity index of 12027 as function of depth (Morris and Lauer 1982).

Smith et al. (1984) determined the mode from thin section for the entire length of the core. Figure 6 is for split # 375. Smith et al found that he agglutinate content is low ~ 10 - 20 % for the entire core.

Chemistry

Smith et al. (1984) analyzed the entire length of 12027. The chemical composition of the top portion (,375) should be compared with that of sample 12023 collected from the bottom of the same trench. The base of the core is KREEP-rich (figure 7).

Processing

The Apollo 12 core tube were 2 cm in diameter (Allton 1989). Core dissection took place in one pass. A portion of the core remaining in the tray after dissection was encapsulated in epoxy and two sets of thin sections were prepared. A polished surface of the encapsulated core is seen in figure at end of this section.

References for 12027

Allton J.H. (1989) Catalog of Apollo lunar surface geologic sampling tools and containers. JSC-23454 pp97 Curator's Office. JSC.

Carrier W.D., Johnson S.W., Werner R.A. and Schmidt R. (1971) Disturbance in samples recovered with the Apollo core tubes. *Proc. 2nd Lunar Science Conf.* 1959-1972.

Duke M.B. and Nagle J.S. (1976) Lunar Core Catalog. JSC09252 rev. Curators' Office

Morris R.V. and Lauer H.V. (1982) Stratigraphy of core 12027 and section 64002 of core 64001/2: FeO and Is/FeO depth profiles (abs). *Lunar Planet. Sci.* **XIII**, 544-545. Lunar Sci. Inst.

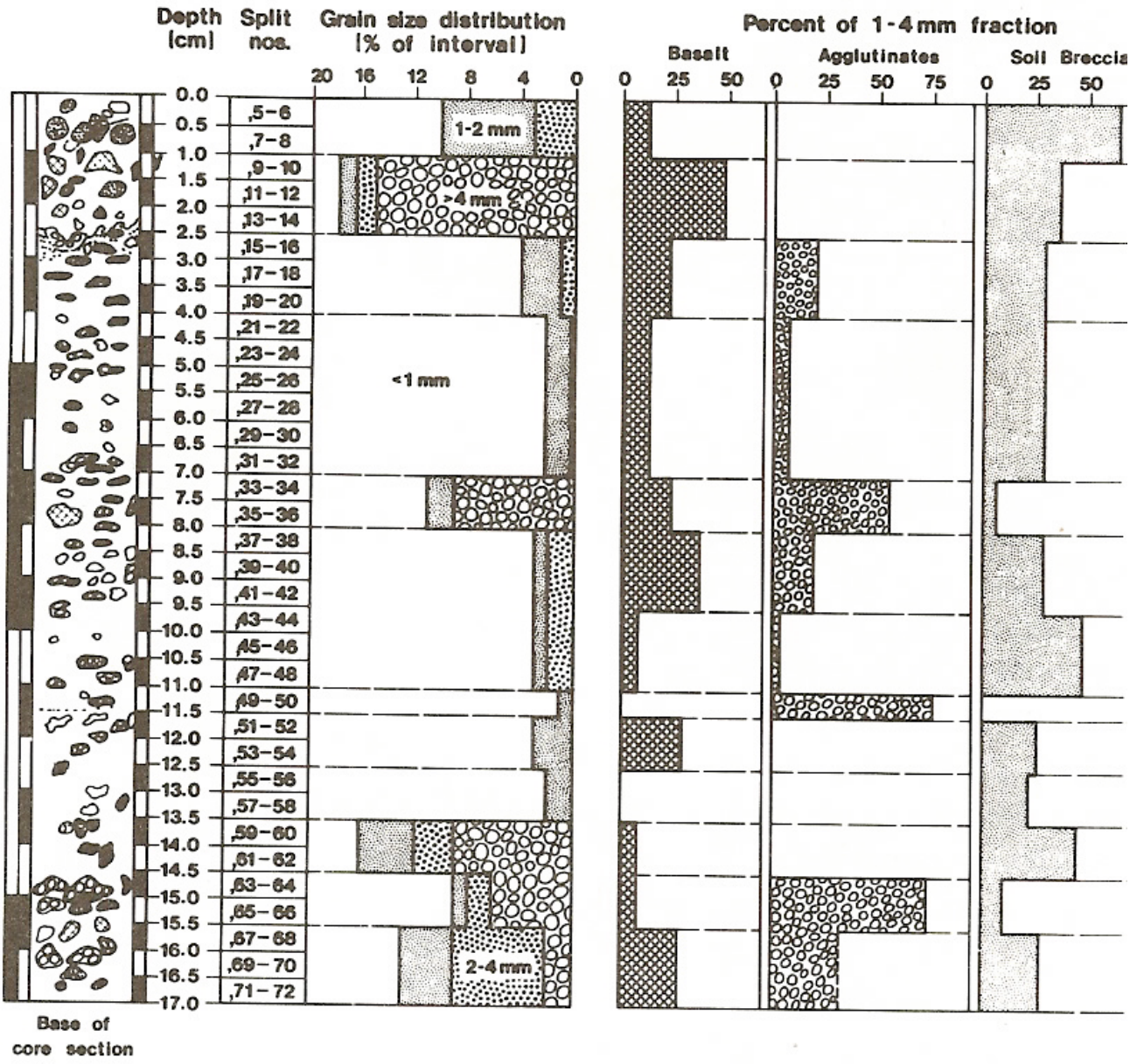


Figure 5: Modal mineralogy as function of depth for 12027 (Nagle 1980).

Nagle J.S. (1980c) Possible rim crest deposits in cores 12027 and 15008: Some interpretations and problems for future research. *Proc. 11th Lunar Planet. Sci. Conf.* 1479-1496.

Smith M.R., Laul J.C., Simon S.B. and Papike J.J. (1985) Chemistry and petrology of Apollo 12 drive tube 12027. *Proc. 15th Lunar Planet. Sci. Conf.* C507-C516.

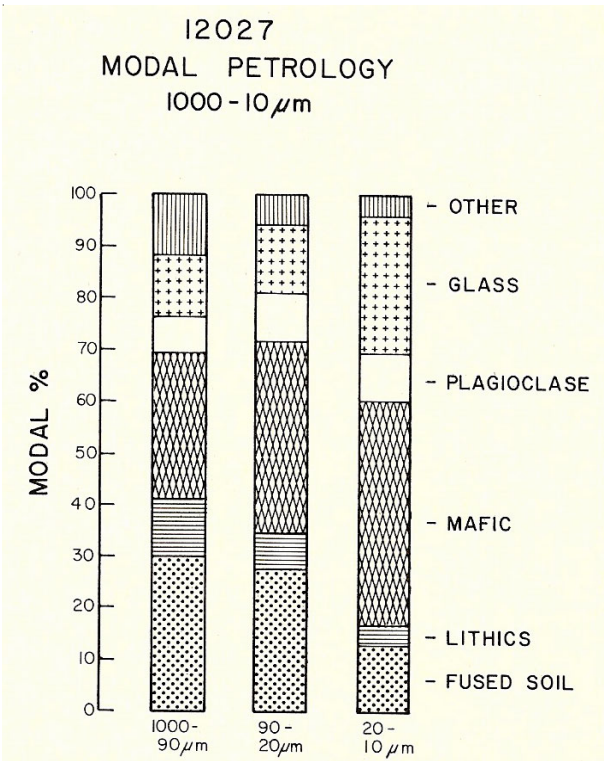


Figure 6: Mode from Smith et al. 1984.

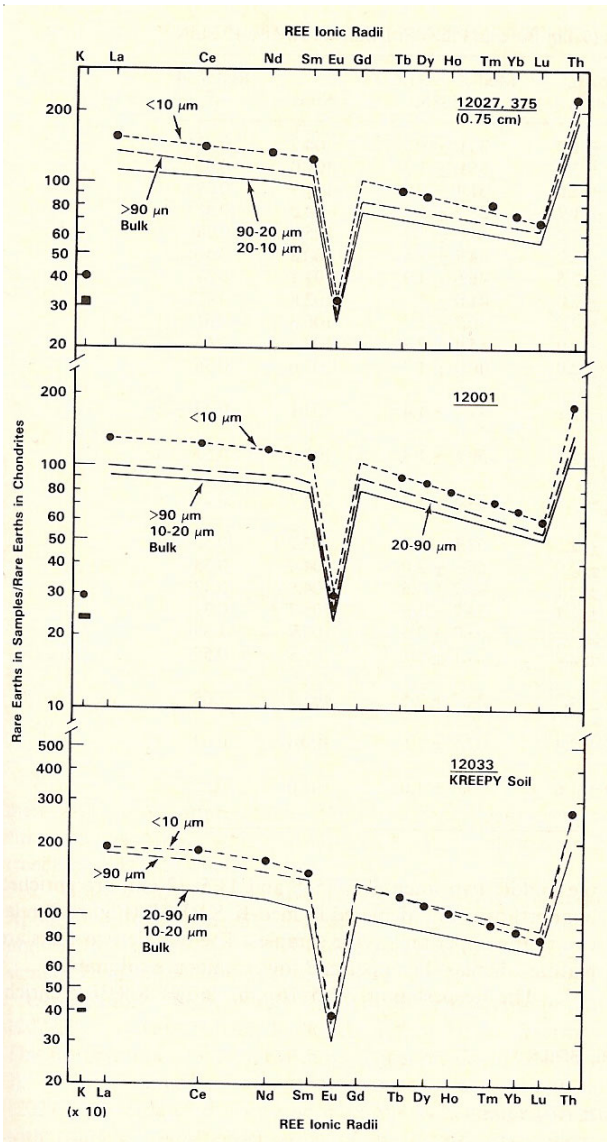
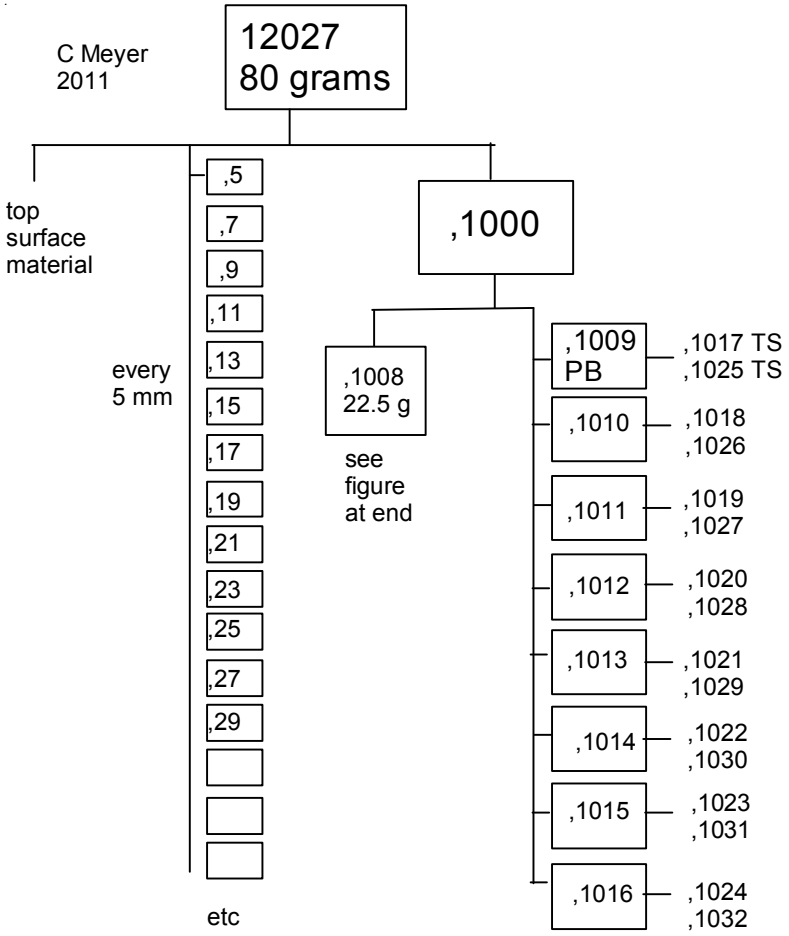
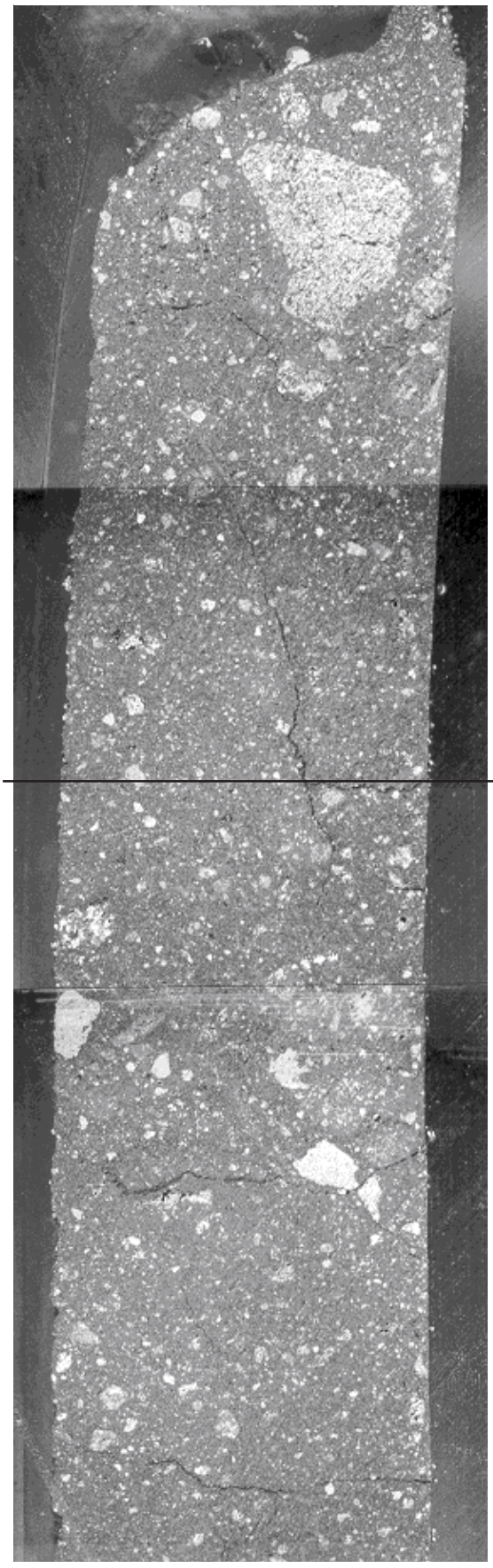


Figure 7: Composition of 12027 compared with other soils (Smith et al. 1984).

Table 1. Chemical composition of 12027.

	12027	
reference	Smith84	
weight	*16 cm*	
SiO2 %		
TiO2	2.6	(a)
Al2O3	13.6	(a)
FeO	16.1	(a)
MnO	0.19	(a)
MgO	10	(a)
CaO	10.8	(a)
Na2O	0.59	(a)
K2O	0.36	(a)
P2O5		
S %		
sum		
Sc ppm	38	(a)
V	110	(a)
Cr	2258	(a)
Co	40	(a)
Ni	*290*	(a)
Cu		
Zn		
Ga		
Ge ppb		
As		
Se		
Rb		
Sr		
Y		
Zr	550	
Nb		
Mo		
Ru		
Rh		
Pd ppb		
Ag ppb		
Cd ppb		
In ppb		
Sn ppb		
Sb ppb		
Te ppb		
Cs ppm		
Ba	540	
La	49	
Ce	120	
Pr		
Nd	80	
Sm	22	
Eu	2.1	
Gd		
Tb	3.6	
Dy	27	
Ho		
Er		
Tm	2.3	
Yb	15.7	
Lu	2.25	
Hf	15	
Ta	2.2	
W ppb		
Re ppb		
Os ppb		
Ir ppb		
Pt ppb		
Au ppb		
Th ppm	7.7	
U ppm	2.2	





0.0 cm

W_1

12027,1008
epoxy
encapsulated
core

1.0 cm

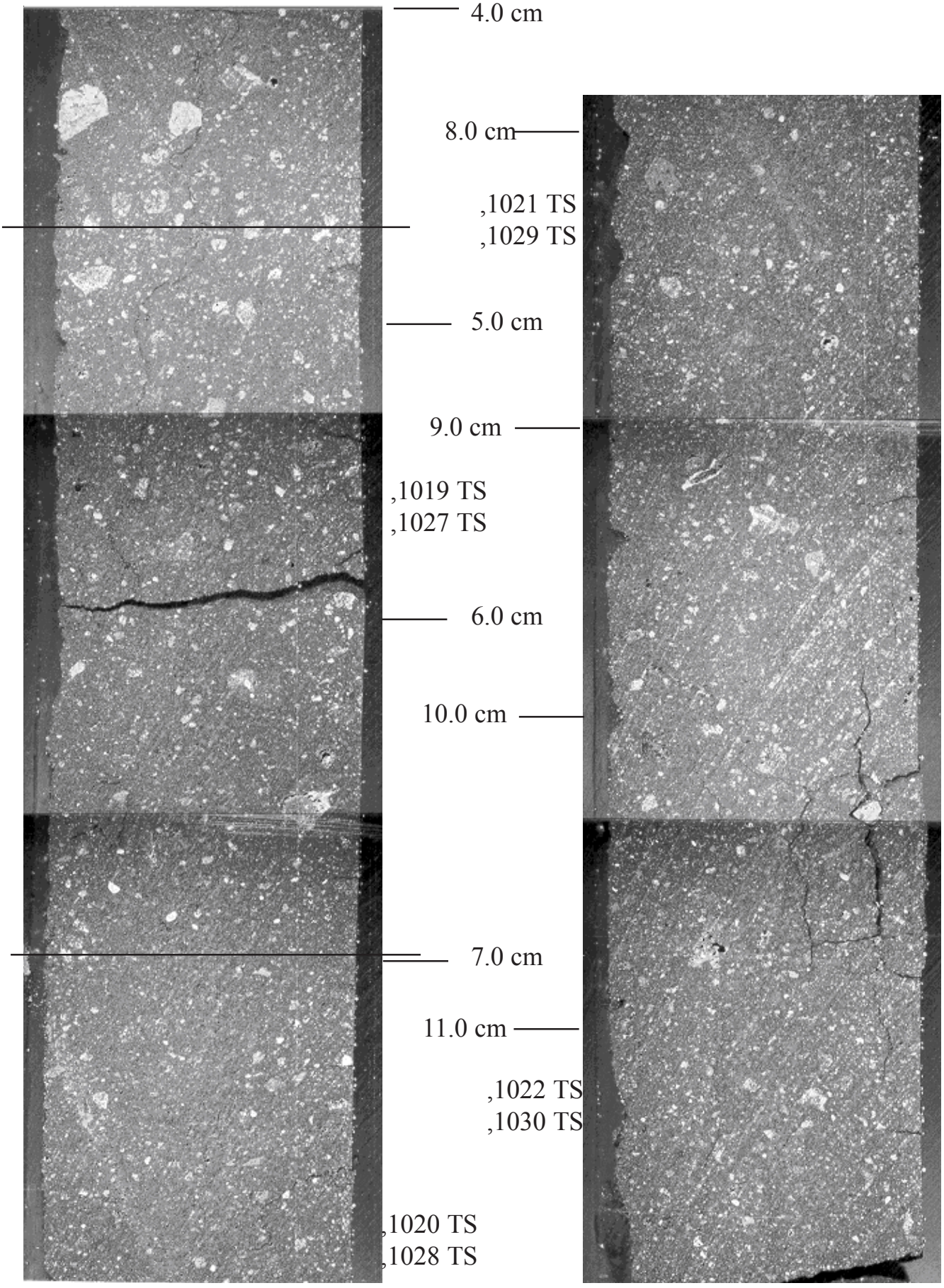
,1017 TS
,1025 TS

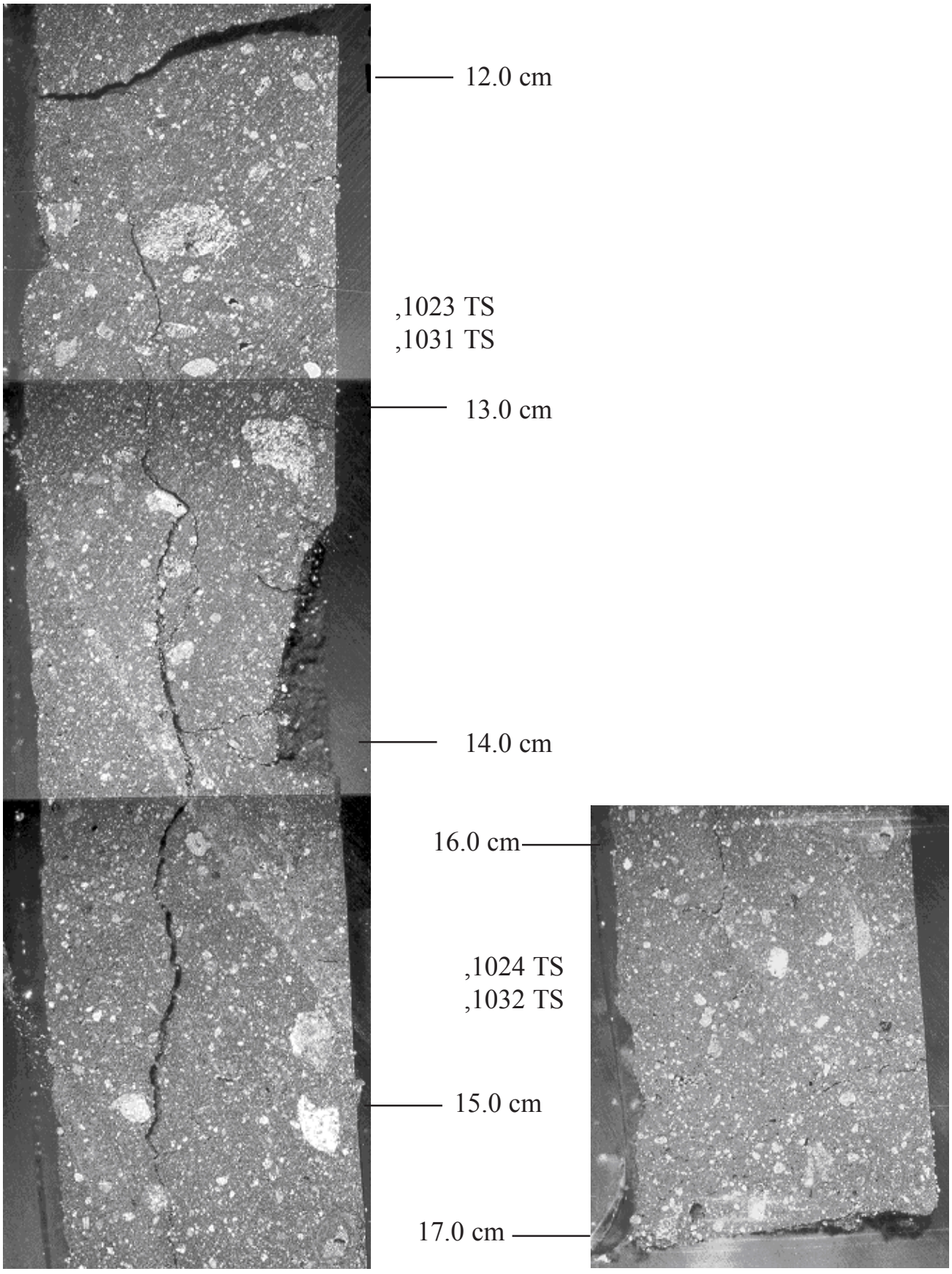
2.0 cm

3.0 cm

,1018 TS
,1026 TS

4.0 cm


4.0 cm
8.0 cm
,1021 TS
,1029 TS
5.0 cm
9.0 cm
,1019 TS
,1027 TS
6.0 cm
10.0 cm
7.0 cm
11.0 cm
,1022 TS
,1030 TS
,1020 TS
,1028 TS


12.0 cm
,1023 TS
,1031 TS
13.0 cm
14.0 cm
16.0 cm
,1024 TS
,1032 TS
15.0 cm
17.0 cm